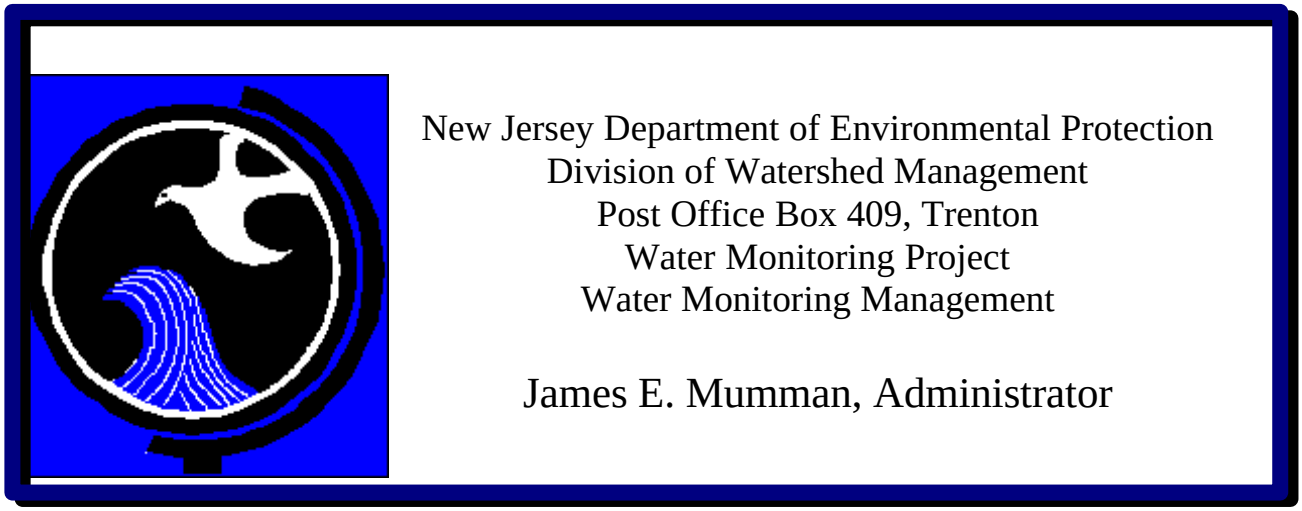

New Jersey Department of Environmental Protection
Division of Watershed Management
Post Office Box 409, Trenton
Water Monitoring Project
Water Monitoring Management

James E. Mumman, Administrator

February 19, 1999

SANITARY SURVEY

ATLANTIC OCEAN

BARNEGAT INLET TO SEASIDE PARK

1995 - 1998

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SANITARY SURVEY

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New Jersey Department of Environmental Protection
ROBERT C. SHINN, Jr.
COMMISSIONER

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EXECUTIVE SUMMARY

The water quality in Atlantic Ocean from Barnegat Inlet to Seaside Park is consistent with the current classification. Area AO7 is located off the coast of the Barnegat Inlet in Ocean County. The last report for this area was a Reappraisal completed in October 1995, which covered data from 1991 through 1994. This report covers water quality data from 1995 through 1998. This report recommends no change to the current classification.

INTRODUCTION

PURPOSE

This report is part of a series of studies having a dual purpose. The first and primary purpose is to comply with the guidelines of the National Shellfish Sanitation Program (NSSP) that are established by the Interstate Shellfish Sanitation Conference (ISSC). Reports generated under this program form the basis for classifying shellfish waters for the purpose of harvesting shellfish for human consumption. As such, they provide a critical link in protecting human health.

The second purpose is to provide input to the State Water Quality Inventory Report, which is prepared pursuant to Section 305(b) of the Federal Clean Water Act (P.L. 95-217). The information contained in the growing area reports is used for the New Jersey State Water Quality Inventory Report (305b) which provides an assessment to Congress every two years of current water quality conditions in the State's major rivers, lakes, estuaries, and ocean waters. The reports provide valuable information for the 305(b) report, which describes the waters that are attaining state designated water uses and national clean water goals; the pollution problems identified in surface waters; and the actual or potential sources of pollution. Similarly, the reports utilize relevant information contained in the 305(b) report, since the latter assessments are based on instream monitoring data (temperature, oxygen, pH, total and fecal coliform bacteria, nutrients, solids, ammonia and metals), land-use profiles, drainage basin characteristics and other pollution source information.

From the perspective of the Shellfish Classification Program, the reciprocal use of water quality information from reports represent two sides of the same coin: the growing area report focuses on the estuary itself, while the 305(b) report describes the watershed that drains to that estuary.

The Department participates in a cooperative National Environmental Performance Partnership System

(NEPPS) with the USEPA which emphasizes ongoing evaluation of issues associated with environmental regulation, including assessing impacts on waterbodies and measuring improvements in various indicators of environmental health. The shellfish growing area reports are intended to provide a brief assessment of the growing area, with particular emphasis on those factors that affect the quantity and quality of the shellfish resource. As the Department implements a comprehensive watershed management program in conjunction with the NEPPS initiative, the shellfish growing area reports provide valuable information on the overall quality of the saline waters in the most downstream sections of each major watershed. In addition, the reports assess the quality of the biological resource and provide a reliable indicator of potential areas of concern and/or areas where additional information is needed to accurately assess watershed dynamics.

HISTORY

As a brief history, the NSSP developed from public health principles and program controls formulated at the original conference on shellfish sanitation called by the Surgeon General of the United States Public Health Service in 1925. This conference was called after oysters were implicated in causing over 1500 cases of typhoid fever and 150 deaths in 1924. The tripartite cooperative program (federal, state and shellfish industry) has updated the program procedures and guidelines through workshops held periodically until 1977. Because of concern by many states that the NSSP guidelines were not being enforced uniformly, a delegation of state shellfish officials from 22 states met in 1982 in Annapolis, Maryland, and formed the ISSC. The first annual meeting was held in 1983 and continues to meet annually at various locations throughout the United States.

The NSSP *Guide for the Control of Molluscan Shellfish* sets forth the principles and requirements for the sanitary control of shellfish produced and shipped in interstate commerce in the United States. It provides the basis used by the Federal Food and Drug Administration (FDA) in evaluating state shellfish sanitation programs. The five major points on which the state is evaluated by the FDA include:

l. The classification of all actual and potential shellfish growing areas as to their suitability for shellfish harvesting.

2. The control of the harvesting of shellfish from areas that are classified as restricted, prohibited or otherwise closed.

3. The regulation and supervision of shellfish resource recovery programs.

4. The ability to restrict the harvest of shellfish from areas in a public health emergency, and

5. Prevent the sale, shipment or possession of shellfish that cannot be identified as being produced in accordance with the NSSP and have the ability to condemn, seize or embargo such shellfish.

FUNCTIONAL AUTHORITY

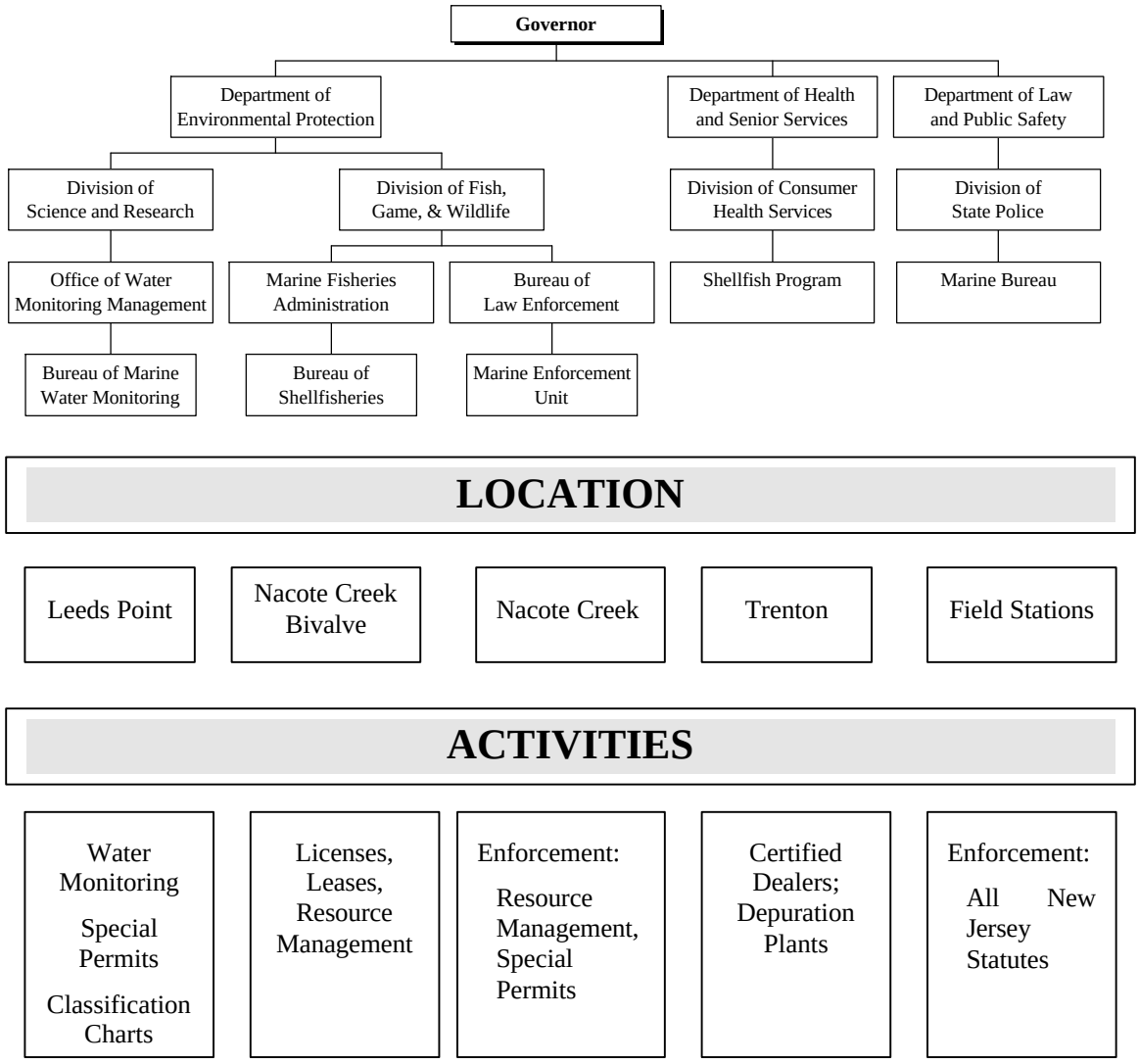
The authority to carry out these functions is divided between the Department of Environmental Protection (DEP), the Department of Health and Senior Services and the Department of Law and Public Safety. The Bureau of Marine Water Monitoring (BMWM) under the authority of N.J.S.A. 58:24 classifies the shellfish growing waters and administers the special resource recovery programs. Regulations delineating the growing areas are promulgated at N.J.A.C. 7:12 and are revised annually. Special Permit rules are also found at N.J.A.C. 7:12 and are revised as necessary.

The Bureau of Shellfisheries in the Division of Fish, Game and Wildlife issues harvesting licenses and leases for shellfish grounds under the Authority of N.J.S.A. 50:2 and N.J.A.C. 7:25. This bureau in conjunction with the BMWM administers the Hard Clam Relay Program.

The Bureau of Law Enforcement in the DEP (Division of Fish, Game, and Wildlife) and the Division of State Police in the Department of Law and Public Safety enforce the provisions of the statutes and rules mentioned above.

The Department of Health and Senior Services is responsible for the certification of wholesale shellfish establishments and in conjunction with the BMWM, administers the depuration program.

FIGURE 1: STATE OF NEW JERSEY SHELLFISH AGENCIES



IMPORTANCE OF SANITARY CONTROL OF SHELLFISH

Emphasis is placed on the sanitary control of shellfish because of the direct relationship between pollution of shellfish growing areas and the transmission of diseases to humans. Shellfish borne infectious diseases are generally transmitted via a fecal-oral route. The pathway is complex and

quite circuitous. The cycle usually begins with fecal contamination of the shellfish growing waters. Sources of such contamination are many and varied. Contamination reaches the waterways via runoff and direct discharges.

Clams, oysters and mussels pump large quantities of water through their bodies during the normal feeding process. During this process the shellfish also concentrate microorganisms, which may include pathogenic microbes, and toxic heavy metals/chemicals. It is imperative that a system is in place to reduce the human health risk of consuming shellfish from areas of contamination.

Accurate classifications of shellfish growing areas are completed through a comprehensive sanitary survey. The principal components of the sanitary survey report include:

1. An evaluation of all actual and potential sources of pollution,
2. An evaluation of the hydrography of the area and
3. An assessment of water quality. Complete intensive sanitary surveys are conducted every 12 years with interim narrative evaluations completed on a three year basis. If major changes to the shoreline or bacterial quality occur, then the intensive report is initiated prior to its l2 year schedule.

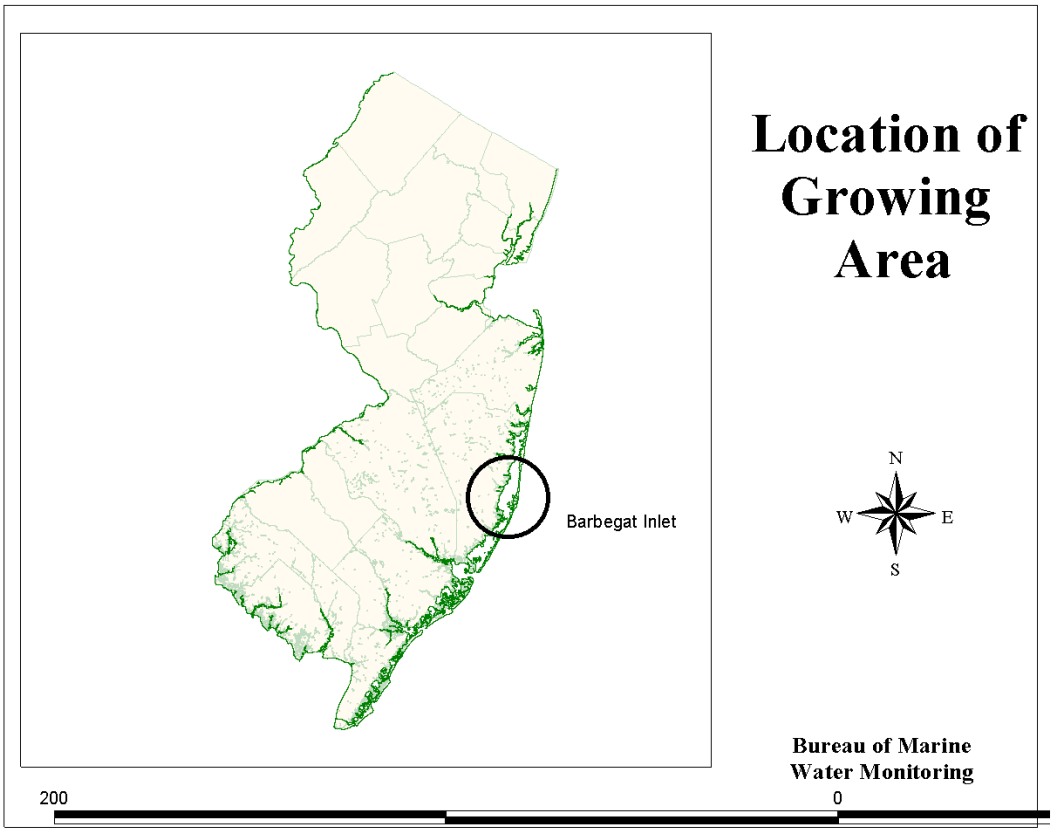
The following narrative constitutes this bureau's assessment of the above mentioned components and determines the current classification of the shellfish growing waters.

DESCRIPTION

LOCATION

The ocean shellfish growing waters in this report include approximately ten miles of coastline from the Barnegat Inlet on the south to as far north as Seaside Park, and offshore to the state's three mile jurisdictional limit. (Be advised that all references to "miles" in this report are in the nautical measure, whereby, one nautical mile equals 6,076 feet.) This area can be found on chart #4 of the NJ Shellfish Growing area classification charts. The last Sanitary Survey for this area covered the time period 1982 through 1986.

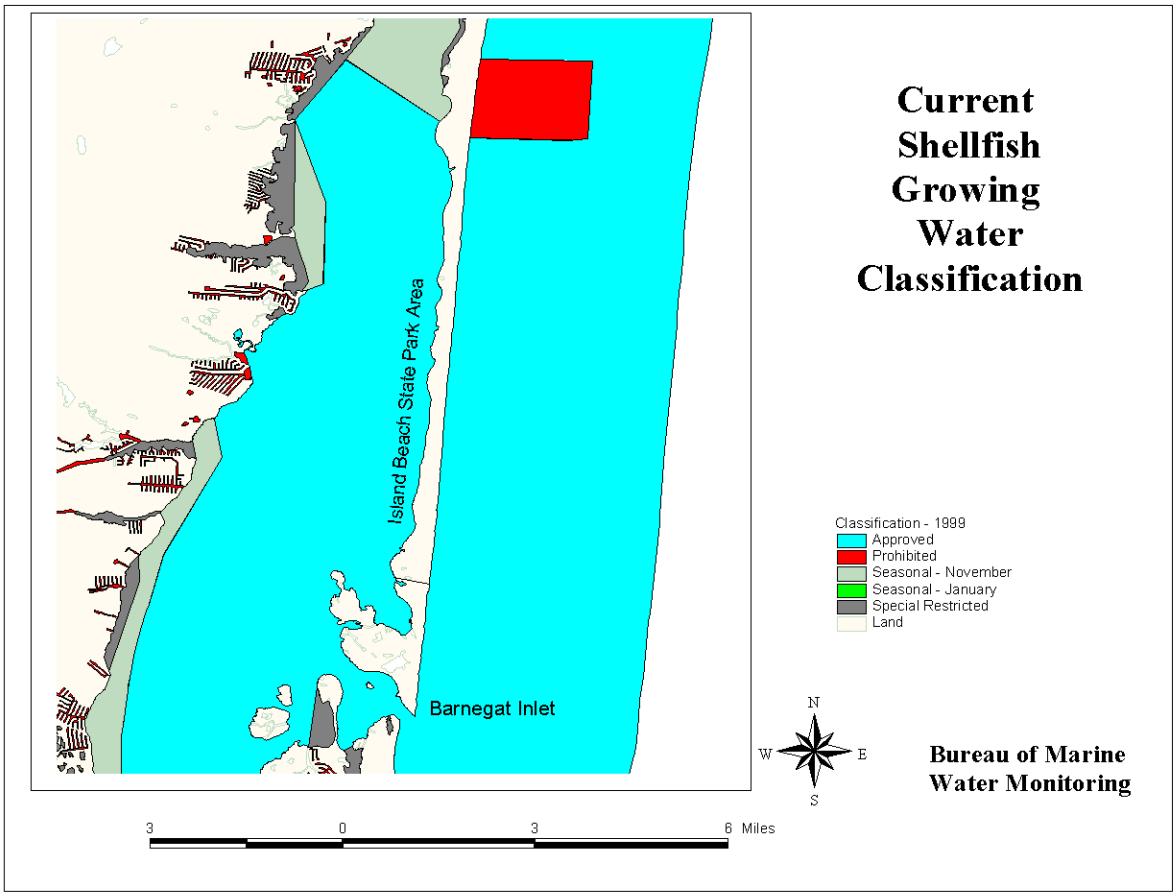
FIGURE 2: LOCATION OF SHELLFISH GROWING AREA AO7 BARNEGAT INLET



DESCRIPTION

This survey area includes the Surf Clam Conservation Zone located off the coast of Island Beach. The *Approved* waters are available for the harvest of surf clams (Spisula solidissima) and blue mussels (Mytilus edulis). The Ocean County Utilities Authority (OCUA) wastewater treatment plant discharge is also located within this area. OCUA's effluent does not impact the *Approved* waters bordering the closed safety zone surrounding the plant's outfall.

FIGURE 3: CURRENT CLASSIFICATION OF SHELLFISH GROWING AREA AO7 – BARNEGAT INLET



HISTORY

In 1987, the Ciba-Geigy waste water treatment facility went through a major upgrading. Prior to this upgrade, this area experienced sporadic high coliform levels after rainfall. As a result of this upgrade and the reliable operation of OCUA's WWTP , approximately 1,585 acres of prohibited shellfish waters, was upgraded to *Approved*, effective January 1, 1993. In 1993, surf clams yielded 48 million pounds of meat in New Jersey for an approximate value of 21.8 million dollars. In 1997, the area between Barnegat and Shark River yielded approximately 7,025,000 US standard bussels of surf clams.

METHODS

Water sampling was performed in accordance with the Field Procedures Manual (NJDEP, 1992).

Approximately 1400 water samples were collected for total and fecal coliform bacteria between 1992 and 1995 and analyzed by the three tube MPN method according to APHA (1970). Figure 3 shows the Shellfish Growing Water Quality monitoring stations in this area. Approximately 24 stations are monitored during each year.

Water quality sampling, shoreline and watershed surveys were conducted in accordance with the NSSP *Guide for the Control of Molluscan Shellfish,* 1997.

Data management and analysis was accomplished using database applications developed for the Bureau. Mapping of pollution data was performed with the Geographic Information System (GIS:ARCVIEW).

BACTERIOLOGICAL INVESTIGATION AND DATA ANALYSIS

The water quality of each growing area must be evaluated before an area can be classified as *Approved, Seasonally Approved, Special Restricted,* or *Seasonal Special Restricted*. Criteria for bacterial acceptability of shellfish growing waters are provided in NSSP *Guide for the Control of Molluscan Shellfish,* 1997. Each shellfish producing state is directed to adopt either the total coliform criterion, or the fecal coliform criterion. While New Jersey bases its growing water classifications on the total coliform criterion, it does make corresponding fecal coliform determinations for each sampling station, these data are viewed as adjunct information and are not directly used for classification. The State Shellfish Control Authority also has the option of choosing one of the two water monitoring sampling strategies for each growing area.

The Adverse Pollution Condition Strategy requires that a minimum of five samples be collected each year under conditions that have historically resulted in elevated coliforms in the particular growing area. The results must be evaluated by adding the individual station sample results to the preexisting bacteriological sampling results to constitute a data set of at least 15 samples for each station. The adverse pollution conditions usually are related to tide, and rainfall, but could be from a point source of pollution or variation could occur during a specific time of the year. Under this strategy, for *Approved* waters, the total coliform median or geometric mean MPN of the water shall not exceed 70 per 100 mL and not more than 10 percent of the samples exceed an MPN of 330 per 100 mL for the 3-tube decimal dilution test. For *Special Restricted* waters, the total coliform median or geometric mean MPN of the water shall not exceed 700

per 100 mL and not more than 10 percent of the samples exceed an MPN of 3300 per 100 mL for the 3-tube decimal dilution test. Areas to be Approved under the Seasonal classification must be sampled and meet the criterion during the time of the year that it is approved for the harvest of shellfish.

The Systematic Random Sampling strategy requires that a random sampling plan be in place before field sampling begins and can only be used in areas that are not affected by point sources of contamination. A minimum of six samples per station are to be collected each year and added to database to obtain a sample size of 30 for statistical analysis.

The bacteriological quality of every sampling station in *Approved* areas shall have a total coliform median or geometric mean MPN not exceeding 70 per 100 mL and the estimated 90th percentile shall not exceed an MPN of 330 per 100 mL. For *Special Restricted* areas, the bacteriological quality shall not exceed a total coliform median or geometric mean MPN of 700 per 100 mL and the estimated 90th percentile shall not exceed an MPN of 3,300 per 100 mL.

This area is sampled under the Adverse Pollution Condition Sampling strategy described above.

MARINE BIOTOXINS

The Department collects samples at regular intervals throughout the summer to determine the occurrence of marine biotoxins. This data is evaluated weekly by the Bureau of Marine Water Monitoring in accordance with the NSSP requirements. An annual report is compiled by the Bureau of Freshwater and Biological Monitoring.

SHORELINE SURVEY

EVALUATION OF BIOLOGICAL RESOURCES

Ocean County Utilities Authority waste water treatment plant's outfall, located at 23rd avenue, South Seaside Park, is the only significant source of contamination in area AO7. The most recent visit to the facility occurred on November 30, 1998. An updated summary of the OCUA facility is below.

The OCUA plant has an average flow in the winter of 21 MGD and 24.5 MGD in the summer. Since the plant has a design flow of 28 MGD, the facility is operating at approximately 75% of design capacity in the winter and 87.5% of design capacity in the summer.

Since the last facility site inspection in 1995, OCUA has installed another influent pump, a fourth primary clarifier, two aeration tanks, another final clarifier and a fine bubble system in the aeration tanks. The upgrades to the plant will allow the facility more treatment options and more flexibility in scheduling planned and unplanned maintenance.

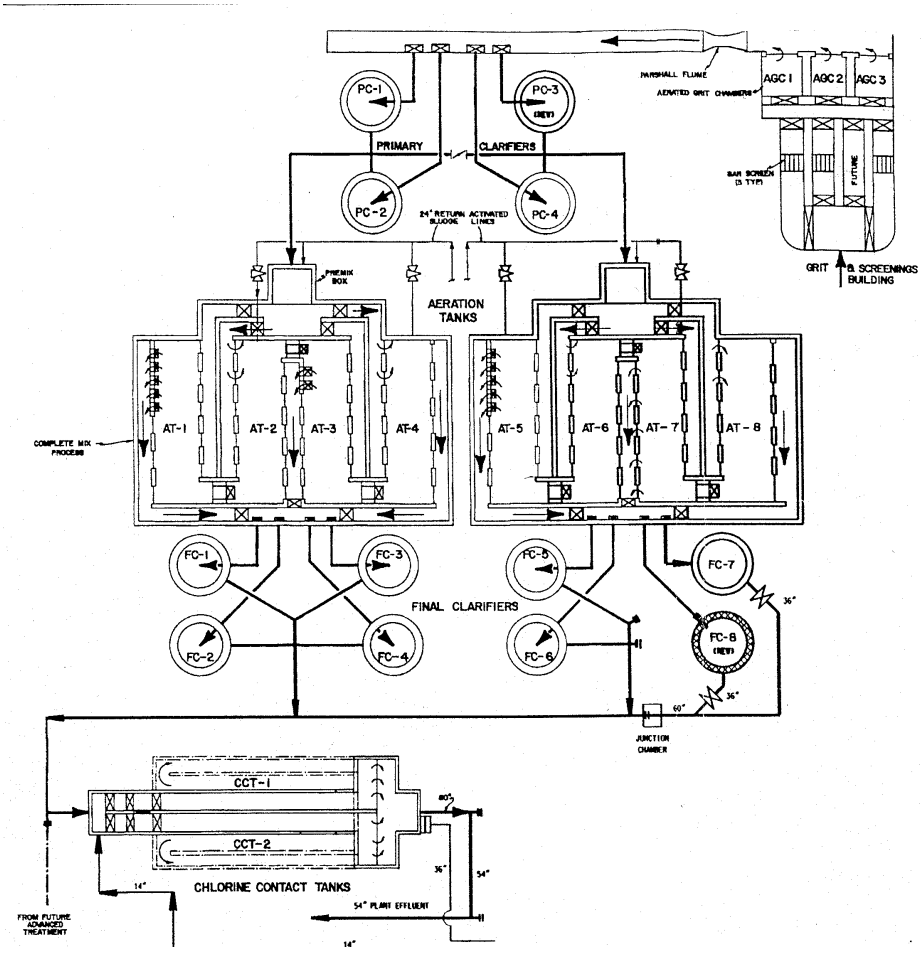
Additionally, the OCUA plant now uses sodium hypochlorite for disinfection. The disinfection system is controlled automatically with a manual back-up.

The OCUA WWTP does effluent bacterial testing once per day. The fecal coliform levels for the winter had an average geometric mean of 2 and a maximum of 20. The value for the summer was 6 MPN/100ml geometric mean with a maximum of 2300. The maximum summer value was after 5" of rainfall. Additionally, the fecal coliform value had decreased drastically by the next day.

The OCUA plant has automatic alarms for high water, power failure and breakdowns. If a problem occurs central operations at the facility is notified, as well as the NJDEP hotline. The facility is staffed 24 hrs/day.

There are no storm water discharges into the ocean. They are all directed into the back bays. The only other source of pollution in this area is from the sea bird population and boating activity (recreational and commercial fishing).

FIGURE 4: OCEAN COUNTY UTILITIES AUTHORITY



IDENTIFICATION AND EVALUATION OF SOURCES

The Ocean County Utilities Authority, as previously noted, is the only direct discharge into this area. The discharge is located at 23rd Avenue in South Seaside Park. (See Figure #5)

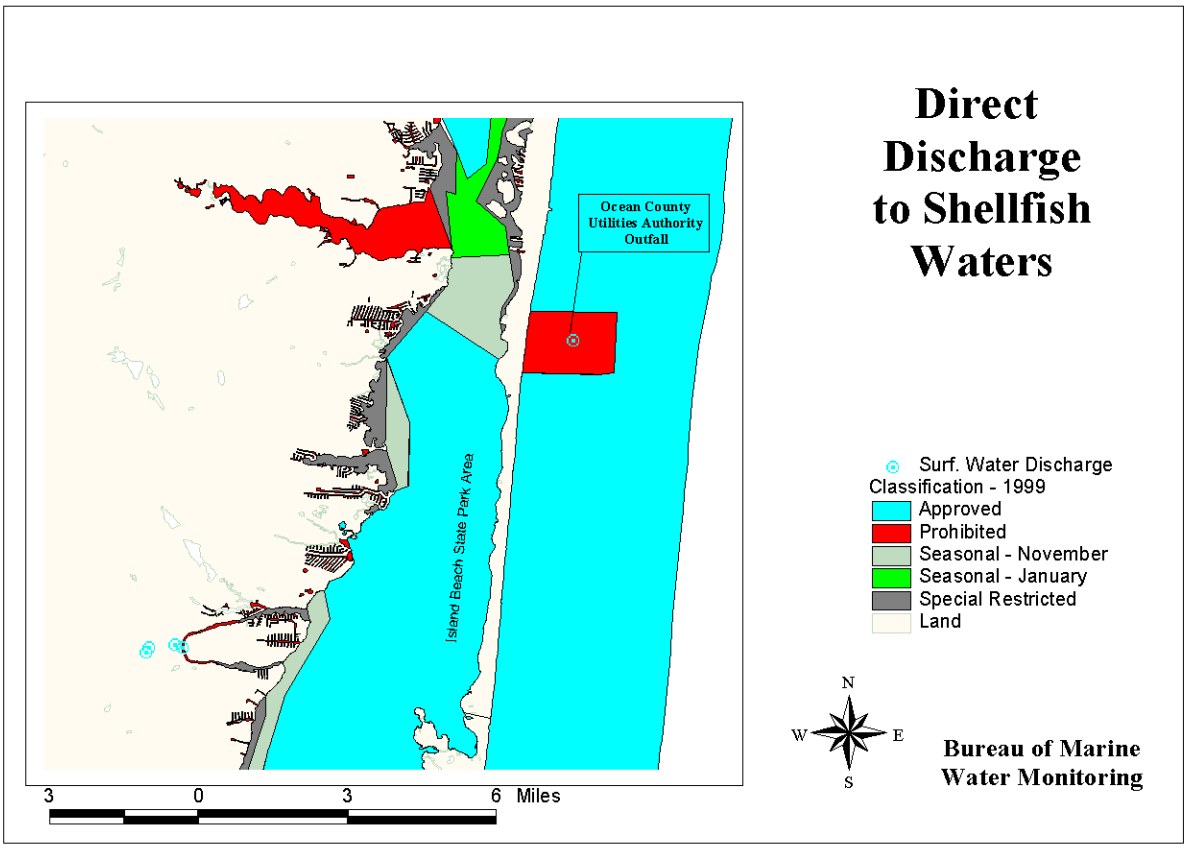


FIGURE 5: DIRECT DISCHARGE TO AREA AO7, ATLANTIC OCEAN - BARNEGAT INLET AREA

HYDROGRAPHY AND METEOROLOGY

The shoreline consists mainly of the Island Beach State Park. The park is not sewered except for the gatehouse at the entrance of the park. The gatehouse is connected via a pump to the regional system. The other structures in the park are on a subsurface disposal system. Based on the water quality values received from the samples taken it is noted that there is no effect on the ocean shellfish waters in AO7.

The park is largely in a natural state. Therefore, most of the storm water in percolated through the sand. There is minimal runoff from parking lots and roads that flow into the ocean or bay.

Precipitation inputs to the area for the period 1995 through 1998 are shown in Table 2. There have been no significant changes in hydrography since the last report dated October 1995. The primary weather station for this area is Toms River. The secondary weather station for this area is Lakehurst. The secondary station data is used when data from the primary station is incomplete.

TABLE 1: CLIMATOLOGICAL DATA

Rainfall Recorded at NOAA's Toms River Station at 0900 hrs; Wind and Temperature aboard sampling vessel at time of sample collection

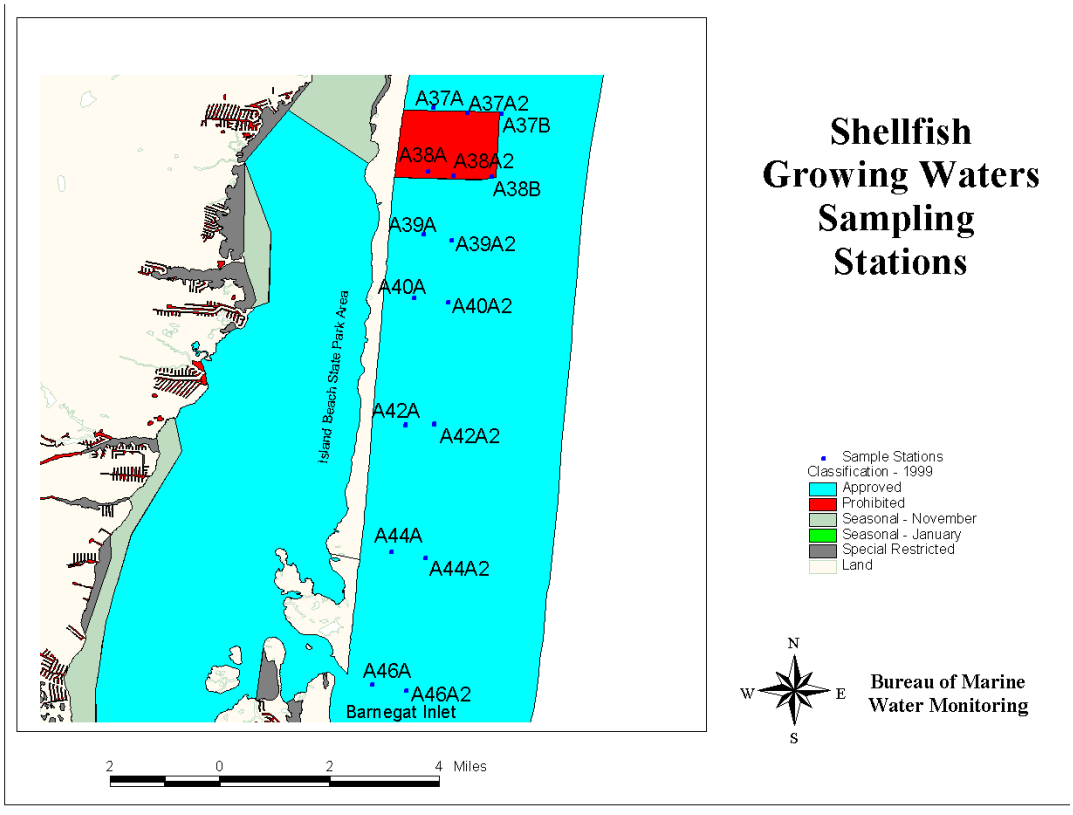
Sampling Date	Precipitation in Inches				Wind		Temperature (°Celsius)	
	Sampling Day	24hrs Prior	48hrs Prior	72hrs Prior	Direction	Velocity	Air	Water
05/09/95	0.000	0.000	0.000	0.000	SW	10	19	14
06/01/95	0.000	0.000	0.160	0.240	E	6	10	11
07/06/95	0.000	0.000	0.000	0.080				
07/31/95	0.000	0.000	0.000	0.000				
09/06/95	0.000	0.000	0.000	0.000				
10/24/95	0.000	0.010	0.660	1.040	S	20	22	18
07/08/96	0.000	0.000	0.000	0.000	S	8	20	20
07/30/96	0.050	0.050	0.050	0.050	SE	8	21	18
08/19/96	0.000	0.000	0.300	0.300	NE	12	24	23
08/26/96	0.000	0.020	0.020	0.020	S	6	27	25
11/14/96	0.000	0.000	0.000	0.000				
08/29/97	-1.000	-1.000	-1.000	-1.000	W	10	22	22
09/05/97	-1.000	-1.000	-1.000	-1.000	NW	10	18	21
10/07/97	-1.000	-1.000	-1.000	-1.000	NW	4	20	20
12/18/97	-1.000	-1.000	-1.000	-1.000	NW	9	5	7
03/19/98	RAIN				SE	9	9	5
07/24/98					NE	5	28	27
09/14/98					SE	15	22	20
09/25/98					E	5	22	24

WATER QUALITY STUDIES

BACTERIOLOGICAL QUALITY

The water quality data collected for this area between January 1995 and December 1998 showed that all samples were within the criteria for *Approved* waters. All of the stations had a median of 3 for total and fecal coliform. However, there was one sampling day, 9/25/98, when several stations had higher readings. Mr. Ken Eckard, Plant Operator for OCUA, has verified that there were no spills or abnormal activity at the plant during that time.

FIGURE 6: SAMPLING STATIONS FOR SHELLFISH GROWING AREA AO7, ATLANTIC OCEAN - BARNEGAT INLETAREA



CONCLUSIONS

BACTERIOLOGICAL EVALUATION

The following was concluded based on the water quality data from January 1995, through December 1998. The *Approved* shellfish growing waters within this area continue to meet NSSP criteria for the classification. The OCUA's effluent is not negativly impacting the waters of this area with health significant coliform levels. OCUA has been reporting any equipment malfunctions and sewage spills to regulatory agencies in compliance with established policy and procedure. Additionally, the facility's improvements have been a positive benefit in maintaining the minmum amount of closed shellfish harvesting waters around the plant's outfall.

RECOMMENDATIONS

BACTERIOLOGICAL EVALUATION

It is recommended that there will be no change in the current classification of the waters in this area. It is also recommended that there be no chance in the present monitoring schedule for this area.

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ACKNOWLEDGMENTS

This report was written under the direction of William J. Eisele, Jr., Chief, and James E. Mumman, Administrator. Robert Connell and Bonnie Zimmer assisted in statistical and GIS data analysis. Special acknowledgment is given to Captain Don Owens for his perseverance in collecting shellfish water quality samples in Area AO7. This study would not have been completed without the analytical capabilities of our microbiology laboratory staff, including Eric Feerst, Supervisor, Bruce Hovendon, Jean Campbell, Eleana Allo, Sheldon McBee, Bob Shuster, and Bob Seabrook.

APPENDICES

A. Statistical Summaries

Yearround

B. Precipitation

Rainfall Correlation

Cumulative Rainfall

D. Data Listing - 1995 through 1998